SEARCH FOR METEORITES NORTH AND WEST OF ELEPHANT MORAINE, VICTORIA LAND, 1987-1988

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During the 1987-1988 field season, the Antarctic Search for Meteorites under the direction of W. A. Cassidy consisted of two field parties. This report details the activities of the Allan Hills party, which was assigned to visit and assess the meteorite concentrations of several blue-ice patches to the north and west of Elephant Moraine (76°17'S 157°20'E).

We were put into the field by helicopter southwest of the main Allan Hills ice field (Figure 1). The first few days were spent collecting samples of dust bands in the ice and rock from the Allan Hills for studies of the glacial history of the area. During this work we found five new meteorites on the main Allan Hills ice field.

We then traversed (Figure 1) to Elephant Moraine by way of the Allan Hills Middle Western ice field (76°50'S 158°26'E), where fuel had been dropped earlier. At Elephant Moraine we searched the ice west of the elephant's trunk from two camps about seven kilometers apart and collected 34 meteorites. Most were found within about three kilometers of the elephant's trunk, in and adjacent to an area that was searched during previous seasons. Few meteorites were found further west. The locations of the meteorites were surveyed and tied to the geoceiver stations established during the 1982-1983 field season (Cassidy et al., 1983).

Camp was then moved about 20 km west of the elephant's trunk (Figure 1). A high concentration of meteorites was discovered on ice where a reconnaissance team had found meteorites in 1982-1983 (Cassidy et al., 1983). This area was given the field name, 'Meteorite City'* (Figure 2). Meteorites were also found on the large, flat, relatively high area of blue

* The official Johnson Space Center names for all meteorites found by the Allan Hills party during the 1987-1988 season will be either Allan Hills (for Allan Hill main and Middle Western ice fields) or Elephant Moraine (for all other locations).

ice south-southwest of Meteorite City, but in lower concentration. This area was called 'Upper Meteorite City.'

A very rich concentration of meteorites was found about 10 km upwind (south) from our camp on the northeast edge of a large blue-ice patch. The meteorites were found primarily on the north facing slope of a large monocline and in the bowl-shaped area below the monocline. We called this area 'Texas Bowl' (Figure 2). Few meteorites were seen on ice to the west and south of Texas Bowl. Most of the meteorites have apparently been blown from the upwind ice and many were trapped by the rough ice surface and bowl shape of Texas bowl.

Figure 2 summarizes the results of our survey of this series of ice patches. During two visits to this area (eleven days in all) we collected 296 meteorites (Table 1). Two small meteorites were found among the pinnacles where meteorites are not usually seen. Meteorite locations were surveyed using stations at recognizable physiographic features. We later tied these survey stations into the geoceiver station at Elephant Moraine. Partial systematic searches were carried out at Meteorite City and Texas Bowl. About two-thirds of the meteorites recovered at Texas Bowl were collected during two days of systematic searching. It is likely that an additional 400 meteorites remain to be collected in this area.

Between our two stays at the Meteorite City camp, we moved about 25 km north-northwest to the 'Northern' ice patch ($76^{o}5'S$ $156^{o}10'E$). Two meteorites were found on this ice patch in 1982-1983 during a long day trip from Elephant Moraine (Cassidy et al., 1983). A relatively careful random search turned up meteorites but compared to Meteorite City and Texas Bowl the concentrations were disappointing. A systematic search of about 1 km^2

suggests that the meteorite concentration on this ice patch is similar to or slightly lower than those at the Allan Hills Far Western and Middle Western ice fields. We collected 31 meteorites from the Northern ice patch, two of which (weighing about 25 and 16 pounds) may be mesosiderites (R. Score, private communication). Because of low fuel, we did not complete a detailed search of the Northern ice patch. An additional 100 meteorites may remain on the ice.

Because of our tight fuel supply, we did not move camp to the 'Far Northern' ice patches (75°50'S 156°0'E) but visited them on a day trip. We swept the length of the eastern-most ice patch (Figure 1) side by side and saw no meteorites and no rocks. The ice making up this patch is transitional between firn and crystalline ice and has a regular ripple pattern on its surface. This contrasts with the clear blue ice and fractured, wind-cupped, ice surface on ice patches with meteorites. We did not reach the other two major ice patches in this area, but we were able to examine portions of them with binoculars. They appear to consist of the same firn-like ice and thus are not expected to have meteorite concentrations.

Upon our return to Allan Hills, while awaiting our helicopter pickup, we surveyed the locations of meteorites collected earlier in the season (and found another meteorite), mapped the dust bands we had previously sampled, and surveyed the positions of some rocks in an experiment set up in 1984-1985 (Schutt, et al., 1986) to see how far rocks of various sizes are blown over time.

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References

Cassidy, W. A., T. Meunier, V. Buchwald, and C. Thompson. 1983. Search for meteorites in the Allan Hills/Elephant Moraine area, 1982-1983. Antarctic Journal of the U.S., 18(5), 81-82.

Schutt, J., L. Schultz, E. Zinner, and M. Zolenski. 1986. Search for meteorites in the Allan Hills region, 1985-1986. Antarctic Journal of the U.S., 21(5), 82-83.

United State Geological Survey. Victoria Land Coast, Antarctica. Satellite image map prepared from ERTS-1 imagery acquired in 1972-1973 and available through the United States Geological Survey.

Table 1. Tentative classification of meteorites recovered by the Allan Hills party, 1987-1988.

	Ord. Chond.	Carbon. Chond.	Achond.	Irons	Stony Irons	Question.	Total
Allan Hills Main	6						6
Allan Hills Mid. Western	1						1
Elephant Moraine	31		5			1	37
Meteorite City	42	4	4				50
Upper Meteorite City	55		2	1	3		61
Texas Bowl	174	8	3				185
Northern	29				2		31
	338	12	14	1	5	1	371

Figure Captions

Figure 1. The 1987-1988 traverse of the Allan Hills party is shown by the solid lines. The darkest areas at the top and right of the map are nunataks; all other dark patches are blue ice. Campsites are shown with open circles. The area within the dashed outline is shown in the sketch map in Figure 2. (Base map is from USGS satellite image map: Victoria Land Coast, Antarctica.)

Figure 2. Sketch map of the area where most of the meteorites were found by the Allan Hills party in 1987-1988. Meteorite numbers represent only those meteorites actually collected. Many more meteorites remain on the ice, particularly at Texas Bowl. Additional smaller concentrations of meteorites were seen on the small ice patches to the northwest of Texas Bowl and east of the pinnacles to the east of Upper Meteorite City.

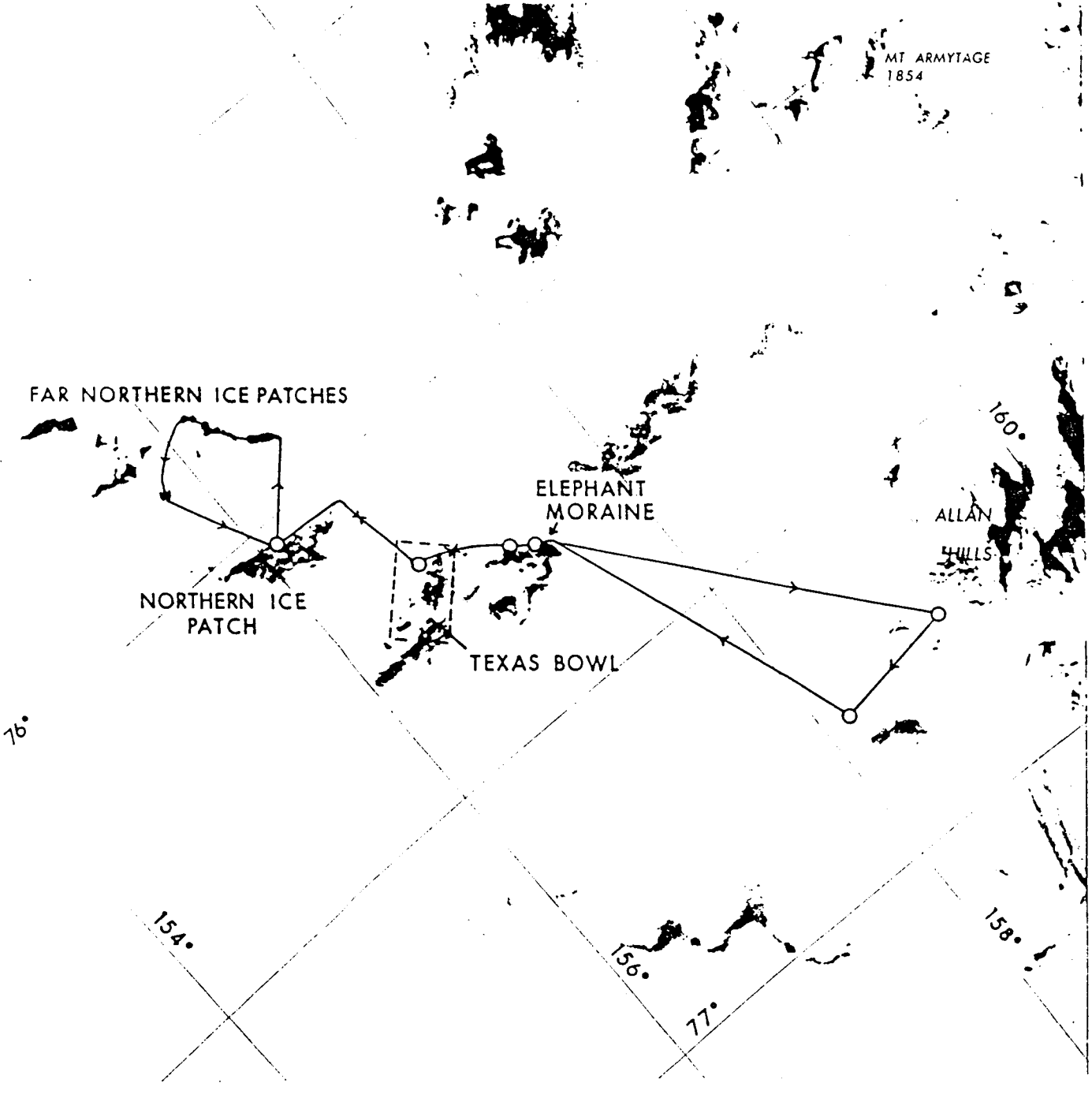
MT ARMYTAGE
1854
FAR NORTHERN ICE PATCHES
ELEPHANT
MORAINE
ALLAN
HILLS
NORTHERN ICE
PATCH
TEXAS BOWL
160°
76°
154°
156°
158°
77°

FIGURE 1

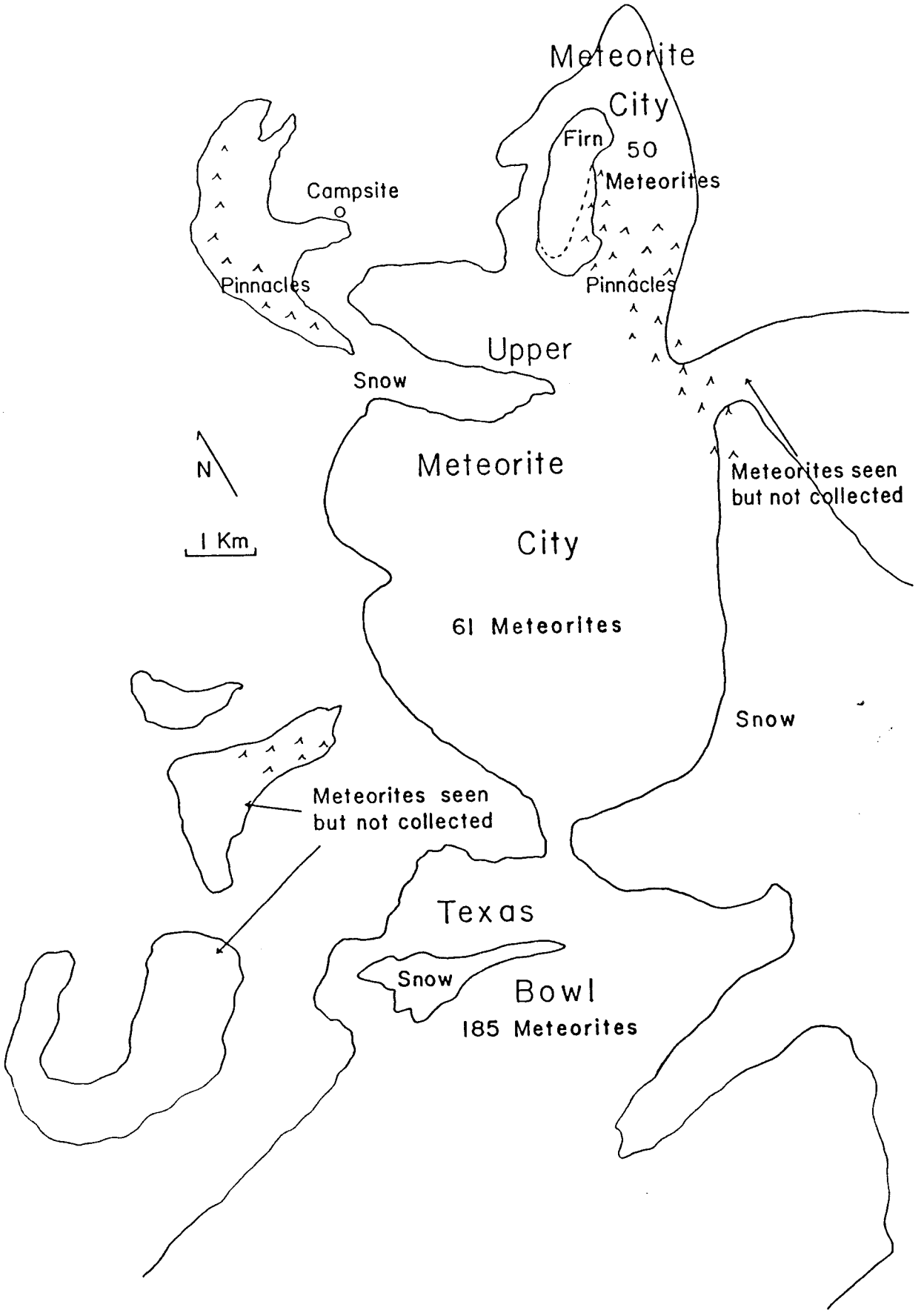
Meteorite
City
Firn
50
Meteorites
Campsite
Pinnacles
Pinnacles
Upper
Snow
N
Meteorite
City
1 Km
61 Meteorites
Meteorites seen
but not collected
Snow
Meteorites seen
but not collected
Texas
Snow
Bowl
185 Meteorites

FIGURE 2